Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D. C. 20554

FCC 96-208

In the Matter of	)	
Amendment of Parts 2 and 15 of the Commission's Rules to Deregulate the Equipment Authorization Requirements for Digital Devices	)	ET Docket No. 95-19

REPORT AND ORDER

Adopted: May 9, 1996 ; Released: May 14, 1996

By the Commission:

INTRODUCTION

1. By this action, we are amending Parts 2 and 15 of our rules to streamline the equipment authorization requirements for personal computers and personal computer peripherals.[1] In particular, we are adopting a new "Declaration of Conformity" (DoC) procedure that will permit these devices to be authorized based on a manufacturer's or supplier's declaration that the computer product conforms with all FCC requirements. Under this procedure, a manufacturer or equipment supplier will test a product to ensure compliance with our standards for limiting radio frequency (RF) emissions and will include a statement, attesting to compliance with those standards in the literature furnished with the product. We are also permitting the marketing of personal computers assembled from separate components that have themselves been authorized under a DoC. In such cases, no further testing of the completed assembly will be required.

2. We anticipate that these rule changes will save industry approximately $250 million annually in administrative expenses, while continuing to provide the same level of protection against harmful interference from personal computing devices to radio

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[1] A personal computer is an electronic computer that is marketed for use in the home, notwithstanding business applications. See 47 CFR Section 15.3(s). A peripheral device is an input/output unit of a system that feeds data into and/or receives data from the central processing unit of a digital device. Examples include keyboards, printers, video monitors and controller cards, sound cards, etc. See 47 CFR Section 15.3(r).

communication services. In addition, the new rules will eliminate the need for manufacturers to obtain FCC approval before marketing new personal computer products and thus will allow such products to reach the marketplace more quickly. We also believe that our relaxation of the existing regulations, which can be particularly burdensome for small manufacturers, will stimulate competition in the computer industry. Further, these changes will align our equipment authorization requirements for personal computers with those used in other parts of the world. This action is consistent with new authority provided in the Telecommunications Act of 1996 that permits the Commission to authorize the use of private organizations for testing and certifying the compliance of devices or home electronics equipment and systems with FCC regulations.[2]

BACKGROUND

3. Parts 2 and 15 of our rules specify regulations and technical standards to control RF emissions from personal computers and computer peripheral devices. These rules ensure that such devices do not cause harmful interference to important communications services such as broadcasting, land mobile services, aeronautical and maritime communications and navigation systems, and amateur radio. The rules specify limits on the radiated emissions and power line conducted emissions from personal computers and computer peripherals.[3] The existing rules further provide that personal computers and computer peripherals must be authorized under our certification procedure before importation and marketing.[4] The certification procedure requires submission of a written application, test report, and fee to the FCC Laboratory, which may also request a sample device for testing. The certification process currently takes about 35 days, but can take longer if additional information must be submitted to complete or correct the application or if a sample is evaluated.

4. In order to meet market demands, several manufacturers, distributors and retailers have been assembling computers using modular computer components such as enclosures, power supplies, and CPU boards. This can result in a wide variety of possible

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[2] See Section 403(f) of the Telecommunications Act of 1996, Pub. L. No. 104-114, 110 Stat. 56 (1996).

[3] The technical standards for personal computers and computer peripheral devices are set forth in 47 CFR §§15.101-15.109.

[4] The provision that personal computers and peripherals are subject to certification is set forth in 47 CFR §15.101. The marketing rules, equipment authorization procedures (including certification), and importation requirements are set forth in 47 CFR Sections 2.801, et seq.

computer configurations, each of which requires testing and authorization.[5] This can be burdensome for manufacturers, especially small assemblers that may build only a few units of any given computer configuration.[6]

5. In the Notice of Proposed Rule Making (Notice) in this proceeding, we proposed to streamline our equipment authorization requirements for personal computers and personal computer peripherals, based on several informal requests from computer manufacturers, distributors and retailers, test laboratories and other interested parties.[7] In particular, we proposed to replace the current certification requirement with a new procedure based on a manufacturer's or supplier's declaration that the computer product conforms with all FCC requirements. We further proposed to require that laboratories testing personal computer equipment for compliance be accredited under the "National Voluntary Laboratory Accreditation Program" (NVLAP) developed by the National Institute of Standards and Technology (NIST). We also proposed to permit the marketing of personal computers manufactured from authorized modular components without additional testing. A total of 57 parties filed comments, and 13 parties filed replies to comments in response to this Notice. A list of commenters is attached as Appendix B.

6. The Telecommunications Act of 1996 (1996 Act), enacted on February 8, 1996, provides the Commission new authority to eliminate unnecessary regulations and functions. In particular, Section 403(f) of the 1996 Act amends Section 302 of the Communications Act of 1934 to allow the Commission to: "1) authorize the use of private organizations for testing and certifying the compliance of devices or home electronic equipment and systems with regulations promulgated under this section; 2) accept as *prima facie* evidence of such compliance the certification by any such organization; and 3) establish such qualifications and standards as it deems appropriate for such private organizations, testing, and certification."[8]

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[5] The rules require that each combination of enclosure, power supply and CPU board that is marketed as a personal computer be tested and receive FCC certification prior to marketing. See 47 CFR Section 15.101(c) and (e).

[6] In some cases, the cost of obtaining a grant of certification for a personal computer, including testing, can exceed $5,000.00. This cost can be prohibitive, especially for a system assembler, such as a retailer, that assembles and markets computers in small quantities.

[7] See Notice of Proposed Rule Making in ET Docket No. 95-19, 10 FCC Rcd 8345 (1995).

[8] See Section 403(f) of the 1996 Act, supra.

DISCUSSION

A. Equipment Authorization Requirements

Declaration of Conformity

7. In the Notice, we proposed to relax the equipment authorization requirements for personal computers and personal computer peripheral devices from FCC certification to a new self-authorization process based on a manufacturer's or supplier's declaration of compliance. Under this proposed new equipment authorization procedure, a manufacturer or equipment supplier would test a product to ensure compliance with our standards for limiting RF emissions and would include a statement of compliance with those standards in the literature furnished with the equipment. We proposed that this statement, to be entitled a "Declaration of Conformity," include the following information: 1) identification of the specific product covered by the declaration (e.g., by trade name and model number); 2) a statement that the product complies with Part 15 of the FCC Rules; 3) identification of the compliance test report by date and number; and 4) identification by name, address and telephone number of the manufacturer, importer or other party located within the United States that is responsible for ensuring compliance. Marketing could begin immediately after testing confirms that the product complies with the standards and the DoC is completed. We proposed that the party issuing the DoC would be the party responsible for ensuring compliance with all applicable FCC requirements and that this declaration must be executed before the subject equipment may be imported or marketed. We further proposed that the responsible party furnish the DoC and test report to the Commission within 14 days if requested.

8. We also invited comment on alternative approaches for deregulating the equipment authorization requirements for personal computers and peripherals. We observed that one alternative would be to retain the existing certification requirement, but to permit marketing to begin as soon as the application is filed. We also noted that another option would be to relax the equipment authorization from certification to notification or verification.[9] We further noted that the proposed new process is very similar to the verification procedure.

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[9] See 47 CFR §§2.902 and 2.904. Verification is a self-approval process where the manufacturer tests the device, retains a record of the result, labels the product as compliant and places information in the user instruction manual to provide guidance on how to correct radio interference. Notification requires the filing of an application for equipment authorization. Under the notification procedure, the applicant makes measurements to determine that the equipment complies with the appropriate technical standards and submits a statement attesting that the device has been found to comply with those standards. Submission of a sample unit or representative data to the Commission demonstrating compliance is not required for either verified or notified equipment unless specifically requested by the Commission.

The two principal differences between verification and our proposed self-approval process are that, under the new procedure: 1) manufacturers must include a copy of the Declaration of Conformity with the information furnished to the user; and, 2) testing laboratories must be accredited under NIST's NVLAP program.

9. The great majority of the commenting parties support our efforts to relax the equipment authorization process for personal computing equipment in some manner. Most parties support our proposal for a new procedure based on a manufacturer's or equipment supplier's declaration of conformity.[10] These parties state that the new process will benefit both the computer industry and consumers by reducing costs and allowing new products and technologies to reach the market more quickly. Several parties also submit that lower prices for equipment will make it possible for more consumers to afford and enjoy the benefits of personal computers. For example, Apple and AT&T state that the new process would stimulate competition in the industry by reducing the amount of time it takes manufacturers to get products into the marketplace. AT&T also notes that the DoC would provide consumers with additional information, including the name, address and telephone number of the party responsible for ensuring that the device complies with FCC regulations. The Information Technology Industry Council (ITI) believes that our proposal is a reasonable balance of regulatory and marketplace interests. It states that this proposal will benefit consumers by lowering equipment development costs and making technology available sooner. ITI further states that interference will not increase as a result of the new procedure, since it does not eliminate the requirement for pre-marketing testing. Motorola believes that the proposed process will continue to ensure a high standard of compliance while minimizing regulatory burdens. HP believes the DoC approach is superior to other options, such as our verification procedure, because it would aid efforts to harmonize our equipment authorization requirements with those of other nations.

10. Several parties recommend that we modify the existing certification process for personal computing equipment to permit marketing of devices upon completion of testing or upon submission of an application to the FCC. Vtech Computers (Vtech), for example, recommends streamlining the existing process to permit marketing upon completion of testing. The Association of Federal Communications Consulting Engineers (AFCCE) and Carl T. Jones suggest that we maintain the existing certification process, but allow

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[10] Parties supporting the Declaration of Conformity approach include ACIL, Apple, AT&T, A2LA, CKC Laboratories, Compliance Consulting Services, Computing Technology Industry Association, Coalition of Concerned Independent Laboratories, Communication Certification Laboratory, Consumers Electronic Group of the Electronic Industries Association, Dell, EESI, Elite Electronic Engineering, Gateway 2000, Hewlett Packard, IBM, Information Technology Industry Council, Information Technology of Canada, Intel, Intellistor O. A. T. S., International Compliance Corporation, MICROEnergy Inc., Motorola, NEC Technology, Norand, Bruce Reynolds, Silicon Graphics, RETLIF, Spirit, Sun Microsystems Computer Company.

manufacturers to market products upon submission of an application to the FCC. PCTEST Engineering Laboratory (PCTEST) similarly recommends that equipment authorization be granted as soon as the application is logged in by an FCC applications examiner. It also suggests that we permit electronic filing of applications through the Internet to speed the authorization of personal computers.

11. Other parties suggest that we apply either our notification or verification procedures to personal computers. Washington Laboratories recommends using the notification process. Canon, Compaq Computer Corporation (Compaq), Sony, Texas Instruments (TI) and Unisys recommend that personal computers be subject to the verification process. EIA/CEG, while supporting the use of a DoC for computers manufactured from modular components, recommends that fully assembled computers be subject to verification.

12. A number of commenting parties, including the American Radio Relay League (ARRL), the Association for Maximum Service Television (MSTV), Capital Cities/ABC, GMC Laboratories (GMC) and others, express concern that deregulating the equipment authorization procedures for personal computing equipment could lead to decreased equipment compliance and increased interference to radio communications services. ARRL argues that the proposed changes would make it easier for manufacturers of non-compliant equipment to market such devices and would also make it more difficult for the Commission to enforce compliance. Capital Cities/ABC and others argue that increased enforcement efforts would be needed if such an approach is adopted. Capital Cities/ABC submits that the current equipment authorization program for personal computers is the reason that the FCC does not receive significant complaints of interference from such equipment. Capital Cities/ABC states that the Commission should not lessen the procedures for preventing excessive RF emissions unless it has the resources, personnel and procedures for monitoring and enforcing the rules. MSTV contends that permitting self-approval by parties that have a financial interest in the outcome of testing will result in decreased compliance. These parties argue that we should not relax the current certification requirement for personal computers and peripherals.

13. With regard to the information to be contained in the DoC, AT&T, Compaq, EIA/CEG, IBM, the Information Technology Association of Canada (ITAC), Spirit, TI, and Unisys believe that including the test report number and date in the DoC is burdensome and unnecessary. EIA/CEG argues that the DoC should only contain a notice that the equipment complies with Part 15 and the identification of the party responsible for ensuring compliance. IBM and ITAC point out that any modifications to the equipment would require retesting and thereby necessitate costly revisions and reprinting of the product user manual that would provide little benefit to consumers. ITAC indicates that only the name and address of the responsible party should be required in the DoC. AT&T also suggests that the responsible party listed in the DoC should include the name, address and telephone number of the manufacturer or importer, if the manufacturer is not located in the United States. TI suggests that a reference code be used to identify the responsible party. Elite Electronic

Engineering Company (Elite) recommends that the DoC include the name of the testing laboratory only if the tests are conducted by an independent laboratory.

14. Several parties, including Apple, AT&T, Compaq, ITI, Bruce Reynolds, Sony, Unisys and Xerox, recommend that manufacturers have the option of providing instructions on how to obtain a copy of the DoC in the user manual, rather than including a copy of the DoC with each product. Compaq indicates that the inclusion of a flyer insert adds an additional step in production that could cause added cost and delays due to errors during packaging. Sony believes that it is unnecessary to include a copy of the DoC with each product and instead supports an expanded labelling requirement that provides information about the appropriate contact person.

15. Several parties discussed the proposed 14 day period for submission of the DoC and test report upon Commission request. Computing Technology Industry Association (CompTIA), Gateway, and IBM believe a 14 day period is sufficient for providing a copy of the DoC to the FCC. IBM requests clarification that the time frame begins at the time of receipt of the FCC request. ITAC requests clarifications of the intention of the 14 day period and recommends adoption of a longer period. ITI and PCTEST argue that 30 days is needed for submission of the test report to the Commission. PCTEST also recommends that the test report and test sample be required to be held for three years.

16. Several parties, including Apple, the Coalition of Concerned Independent Testing Laboratories (CCITL), Compliance Engineering Services (CES), Dell Computer Corporation (Dell), Electromagnetic Engineering Services, Inc. (EESI), Mark Lapchak, and Bruce Reynolds, recommend that some form of FCC filing should be required as part of the DoC process. Apple believes that manufacturers and suppliers should be required to submit a copy of the DoC to the Commission when a product is offered for sale. CCITL suggests that a minimum FCC filing requirement be adopted and that the information provided on filings under this requirement should be listed on the FCC Laboratory's "Public Access Link" system. CCITL proposes that the filing requirement include an identifying number, brief description of the equipment, photographs, DoC statement, and the identity of the test lab. Dell recommends requiring that a copy of the DoC always be submitted to the FCC, rather than only upon request. CES and EESI recommend that some form of FCC filing be maintained and support continued use of FCC ID numbers.

17. Decision. The record in this proceeding provides significant support for our efforts to relax the equipment approval requirements for personal computing devices. We continue to believe that our proposal to establish a new procedure based on a manufacturer's or supplier's declaration of conformity is the most appropriate method for authorizing personal computers and peripherals.

18. We believe that the new DoC process will provide a number of important benefits for manufacturers and suppliers of personal computing equipment and that these benefits would accrue to businesses and consumers as well. Initially, we observe that this

new equipment approval process will permit manufacturers to introduce new equipment into the market more rapidly and to avoid a substantial portion of the costs involved in the current certification process. We also believe that reducing the time-to-market of computer products will allow manufacturers and suppliers to compete more effectively in the market for these products. Further, the new process will protect manufacturers' and importers' business interests by eliminating the premature disclosure of new products that occurs in the filing of applications for certification. These improvements for manufacturers and suppliers can be expected to benefit consumers in the form of lower prices, additional product features and improved product quality.[11]

19. We do not agree with comments expressing concern that implementing the DoC procedure will result in increased non-compliance of personal computers and computer peripheral devices. These devices must still be tested to ensure compliance with our standards. As long as the measurement procedures are properly followed and testing is performed by a competent laboratory, there appears to be no valid reason why compliance under the DoC procedure should be any different than under our existing certification procedure. We also do not agree that it is necessary to mandate the automatic filing of information with the Commission. The DoC will provide a clear indication that the product complies with our requirements and will provide a mechanism for identifying responsible parties should questions arise regarding compliance. We believe that an additional requirement for filing of information with the FCC would not provide any added assurance of compliance and would create an unnecessary administrative burden.[12] In summary, we find that the new DoC procedure will substantially reduce the burden of equipment authorization on manufacturers and importers of personal computer equipment without significantly raising the risk that such equipment will cause harmful interference to communications users.

20. We also observe that this new equipment authorization procedure is similar to product approval programs for digital devices employed in other parts of the world. In Europe, for example, manufacturers are permitted to self-declare compliance with radio noise standards for personal computer equipment. There is growing interest in the international

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[11] Based on the implementation of the new DoC procedure for digital devices, we may consider using the DoC as a guide to re-evaluate other equipment authorization processes in future proceedings.

[12] We further find no merit in requiring manufacturers to submit a filing to be listed on the FCC Public Access Link (PAL) system. We believe that the information necessary to identify the equipment and a responsible party is readily available from the DoC, product label and user manual information. Additionally, the PAL system references equipment based on the FCC ID number, which is not part of the DoC process and therefore would require either a modification of the PAL system or the development of a separate system to maintain the DoC filings.

harmonization of standards, test methods and product approval procedures to better facilitate trade.[13] We have, in fact, taken actions in the past to harmonize the standards and measurement procedures for personal computer equipment with those accepted internationally.[14] We believe our DoC plan may advance the acceptance of U.S. product approvals for personal computers and their associated peripherals in other countries. This could potentially provide U.S. manufacturers easier access to foreign markets, thereby creating jobs and enhancing U.S. economic growth.

21. We do not agree with the comments suggesting that it would be more appropriate to streamline our existing certification procedure, or to use our notification or verification procedures. Streamlining the certification process or using the notification procedure would place a larger burden on both industry and FCC staff than the DoC approach, without a significantly increased benefit to the public. Furthermore, there are potential problems with these approaches. For example, if we were to permit products under certification or notification[15] to be marketed upon submission of an application to the Commission, paperwork and other administrative errors in that submission could result in a manufacturer having to cease all marketing while problems with the application were corrected. This could result in a costly burden to the manufacturer. We also do not believe that our

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[13] For example, the North American Free Trade Agreement (NAFTA) Article 1304-6 calls for each of the parties to adopt, as part of its conformity, assessment procedures, provisions necessary to accept the test results from laboratories or testing facilities in the territory of another party for tests performed in accordance with the relevant standards related measures and procedures. The Asia Pacific Economic Cooperation (APEC) Forum has adopted guidelines promoting the regional harmonization of procedures for the certification of telecommunications equipment. These guidelines state that APEC Member Economies should accord mutual acceptance of laboratory test data from other Members that is performed in accordance with the accepting Economy's standards and technical requirements. (Certain digital devices, such as computer modems, are also telephone terminal equipment.) The APEC guidelines also call for certifications procedures to be streamlined, to provide equipment suppliers with a timely approval process containing minimal administrative obstacles. In addition, at the December 1994 Summit of the Americas hosted by the United States, the Organization of American States' Inter-American Telecommunications Commission (CITEL) was tasked with examining ways to promote greater consistency of the authorization processes for telecommunications equipment among member countries. CITEL is developing guidelines similar to those in the APEC Forum.

[14] See Report and Order in GEN Docket Nos. 89-116, 89-117, and 89-118, in the matter of procedure for measuring electromagnetic emissions from intentional and unintentional radiators, 8 FCC Rcd 4236 (1993). See also Report and Order in ET Docket 92-152, in the matter of revision of Part 15 of the Rules to harmonize the standards for digital devices with international standards, 8 FCC Rcd 6772 (1993).

[15] See 47 CFR Section 2.971 et seq.

verification process would provide sufficient information and safeguards to ensure compliance with regard to computer technology, which is continuing to evolve rapidly. Further, verification would appear inconsistent with international approaches for approval of personal computers and peripherals.

22. We agree with the comments that the requirement to include the name of the test laboratory and the date on which compliance testing took place would pose an unnecessary burden. Computers and peripheral devices sometimes go through several modifications in short periods of time, each of which requires retesting. Requiring the test laboratory information to be updated each time these tests are made could result in an administrative burden. While this information will have to be readily available to the FCC, upon request, it generally serves no purpose for the consumer and therefore is not needed on the DoC. We believe that it is important to include a copy of the DoC with the product either as a separate insert or in the user's manual, to verify compliance of a product and provide a readily accessible contact person for inquiries from consumers and the FCC. We do not believe that providing the minimal information requested in a DoC will pose an undue burden. Accordingly, we will require that the DoC statement be included with the equipment and contain the following information: 1) identification of the specific product covered by the declaration, such as by trade name and model number; 2) a statement that the product complies with Part 15 of the FCC Rules, similar to the statement currently required under Section 15.19(a)(3) of the regulations[16]; and 3) the identification by name, address and telephone number of the manufacturer, importer or other party located within the United States that is responsible for ensuring that the equipment complies with the standards.[17] The DoC statement may be included as a separate document or may be included in the user's manual supplied with the product.

23. The party responsible for ensuring compliance will be required to submit, upon request, documentation verifying compliance, including test reports, to the Commission within 14 days of such a request. With the availability of express and overnight delivery services, 14 days is ample time to submit documentation that is required to already be readily available. We clarify that this 14 day period begins upon the delivery of the request to the responsible party.[18] Finally, we do not agree with the request that the test report and test

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[16] See 47 CFR Section 15.19(a)(3).

[17] See 47 CFR Section 2.909(b). The responsible party is the final manufacturer, if the manufacturer is located within the United States. If the final manufacturer is not located within the United States, the responsible party is the importer.

[18] The Commission's request will be made by certified mail. The 14 day period will begin on the date of acceptance of the certified mail or the date of an attempted delivery that was refused by the responsible party.

sample should be held for three years.[19] We believe that it is important to retain this information for a sufficient length of time to verify compliance with our rules in enforcement matters. We note that under the certification process, where the Commission has reviewed the application and data and granted an authorization, we require the retention of records for one year after the manufacturing of a product is discontinued. However, under the notification and verification processes, where the Commission has not reviewed the application and data, we require the retention of records for two years after manufacturing is discontinued.[20] Accordingly, since the new DoC process will not require prior review by the Commission and since we want to maintain consistency with our other equipment authorization processes, we will require the manufacturer to retain a record of all documentation for a period of two years after manufacturing is discontinued.

Labelling Requirement

24. Under our current rules, personal computers and peripherals must be labelled with an "FCC ID" and a general statement of compliance with the standards.[21] In the Notice, we proposed to require that personal computers and peripherals display a small logo to indicate compliance with FCC Rules. This logo would be similar to the "UL" logo used by products that comply with standards developed by the Underwriters' Laboratories or the "CE" logo that indicates compliance with European standards, and would replace the existing FCC ID label requirements. Comments were invited on the specific format for such compliance labelling.[22] We also invited comments as to whether this labelling is necessary and whether the benefits of this requirement warrant the costs. No changes were proposed to the existing requirement to provide information in the user manual regarding steps to be taken in the event the equipment causes interference.[23]

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[19] We interpret the three year period requested by PCTEST to be three years from the date of testing.

[20] See 47 CFR Sections 2.955(b), 2.975(g) and 2.938(c).

[21] See 47 CFR Sections 2.925, 2.926 and 15.19(c)(3).

[22] Recognizing that the North American Free Trade Agreement (NAFTA) calls for making compatible, to the greatest extent practicable, standards for all goods and services, we also invited comments on the general harmonization of technical standards and equipment authorization requirements for all types of products, we also invited comments on whether a North American Class A or Class B label might be more appropriate. While Class B products may be used in any environment, including residential, Class A digital devices incorporates products that are used only in an industrial, commercial or business environment. See 47 CFR Section 15.3(h) and (i).

[23] See 47 CFR Sections 15.19 and 15.105.

25. The commenting parties support improvements to the existing labelling requirements for personal computers and peripherals. Most parties recommend that we adopt a simple, easily recognizable logo. Apple, Cannon, IBM, ITAC, and Bruce Reynolds support the use of a small compliance logo. They also recommend coordination with Canada and Mexico to develop a NAFTA logo as long as it would not cause a delay in the adoption of the proposal. HP and TIA recommend use of a logo that is suitable for multinational use and support a simple logo that references the FCC or CISPR class.[24] Gateway agrees that a logo identification is necessary to provide reassurance to consumers that a product meets appropriate standards. However, it submits that a North American logo is unnecessary, as Mexico and Canada currently accept the FCC ID for radiated and conducted emission compliance. CKC and Compaq suggest that we recognize the CE mark as equivalent label to the FCC label.

26. CompTIA supports the use of a simple label similar to the "Intel Inside" logo. IBM and TI urge that the label include a "A" or "B" to designate the emission class of the device.[25] ITI and ITAC believe that a pictorial logo is appropriate for devices assembled and tested by manufacturers but urges adoption of a special label for computers assembled with modular components. HP recommends that systems assembled from components should not indicate that the computer complies with Part 15.[26] It states that only systems that are tested as such should claim conformity on their DoC. Silicon Graphics believes simple text labelling is adequate and that an FCC logo is unnecessary. However, it states that extensive labelling notifying the user of potential interference should be used for computers composed of modular components.

27. EESI supports the use of a compliance logo and a text-based product label similar to the current label. Intel believes that the current label is adequate, when coupled with the warning text required in the manual. ICC proposes a modified version of the current label that would include a "DoC ID" number composed of codes for the grantee, NVLAP lab and the test report number. Sony recommends a permanent label that states

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[24] The International Special Committee on Radio Interference (CISPR) is a voluntary standards-making organization under the auspices of the International Electrotechnical Commission. CISPR develops recommendations for limits and methods of measurement to control radio interference by computers and various other devices. Many other countries, most notably those of the European Union, are adopting computer interference requirements based on CISPR standards. Sections 15.107 and 15.109 of our rules, 47 CFR §15.107 and 15.109 allow computers to comply with CISPR standards as an alternative to our emission limits.

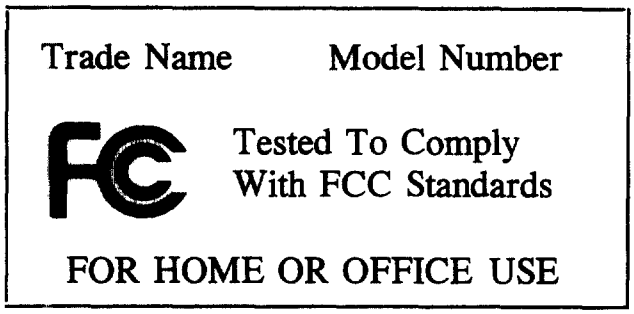
[25] Under our Part 15 rules, Class A computers are intended for business and commercial use and are permitted higher emissions levels than Class B computers, which are intended for residential use and are marketed to the general public. See 47 CFR §§15.3(h) and (i).

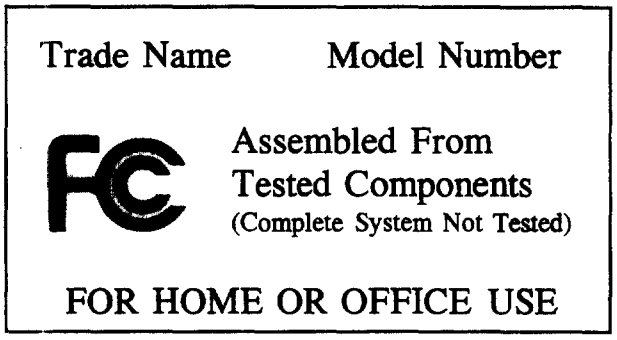
[26] This is discussed later when we address the assembly of modular computers.

compliance and includes an address or phone number for the responsible party to contact in case of any interference or to obtain a copy of the test report. On the other hand, M. A. Plante recommends that the logo not contain variable information that is unique to the product. Xerox opposes maintaining the current warning statement on the label and instead believes that any warnings should be placed in the user manual. Finally, Gateway, M. A. Plante and Tokin agree that it will still be necessary to include an informational statement in the user's manual regarding steps to be taken in the event of interference.

28. Decision. As proposed, we are replacing the existing FCC ID label on personal computing equipment with a new, simplified label that includes a compliance logo. We believe that the new label and FCC logo will increase public awareness of our technical standards and testing requirements for personal computers and will promote demand for properly approved devices. Further, we are specifying separate labels for products that are assembled and tested by manufacturers and those that are assembled from modular components. This will provide information for FCC enforcement purposes and will also inform consumers of the differences in the manner in these devices comply with the rules. Consistent with our existing rules, we are also requiring that the new labels for computing devices uniquely identify the product with a trade name and type or model number. This will ensure that equipment marketed under more than one brand name can be properly identified in a request for documentation verifying compliance.

29. In choosing a logo and label format, we considered the following factors: 1) the logo should be easily recognizable; 2) the logo and label should convey information about its purpose; and 3) the label information and message should be simple and easily understandable. Accordingly, we have designed the following two labels:





30. We recognize the advantages of having a uniform labelling requirement and logo that could be accepted throughout North America or the world. We intend to pursue the development of a common international compliance label for personal computing devices and encourage industry support of efforts in this regard. When such a label and/or logo is developed, we will revisit our labeling requirements for personal computing equipment. As a final matter, we are requiring that all warning statements regarding interference potential be placed in the user manual, rather than on the label as is currently required. The user manual contains general operating instruction on the use of a device and we believe that placing the warning statements in the user manual would better server the consumer. We are also maintaining our requirement that an informational statement be included in the user's manual regarding actions the user can take to resolve any interference that may occur from use of the device.

Accreditation of Test Laboratories

31. In the Notice, we indicated that it was important under a self-authorization program to ensure that laboratories can adequately perform the compliance testing. Accordingly, as noted above, we proposed that laboratories testing personal computers and personal computer peripheral devices be accredited under the NIST's NVLAP program.[27] We observed that laboratory accreditation is generally required, either implicitly or explicitly, under most foreign product approval procedures. We also requested comments on whether to permit alternative methods of accrediting laboratories, such as that offered by the American Association for Laboratory Accreditation (A2LA). We further asked for comment on whether the laboratory accreditation requirement should apply to manufacturer's laboratories. We proposed a transition period of two years to permit laboratories to obtain NVLAP accreditation. Within that two-year period, laboratories that had not been accredited would be allowed to continue to obtain authorizations of personal computers and peripheral devices under the current certification procedure.

32. Several parties, such as CCL, ICC, M. A. Plante, Motorola and Norand, support the proposed requirement for NVLAP accreditation of laboratories that test personal computer equipment. Motorola states that accreditation through NVLAP would offer a number of advantages for the U.S. industry and would support U.S. efforts for international harmonization of equipment approval. CCL similarly observes that laboratory accreditation is being imposed in other parts of the world such as Australia, South Korea, Canada, Mexico and Europe. In addition, a number of parties, including A2LA, C&C Laboratory, Cannon, Carl T. Jones, CES, CCITL, CKC, CompTIA, Diversified, EESI, Gateway, IBM, Intellistor and Bruce Reynolds support accreditation of testing laboratories, but request that alternatives to NVLAP accreditation be permitted. These parties observe that NVLAP accreditation is costly and that currently there are only a limited number of NVLAP approved labs. They recommend that private sector accreditation be permitted. A2LA estimates that it could provide accreditation at about two-thirds the cost of NVLAP accreditation. Carl T. Jones believes that some accreditation program may be necessary, but does not agree that NVLAP is the appropriate program. EESI supports lab accreditation and recommends that the NIST

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[27] Under this program, NIST reviews the qualifications of a laboratory's testing personnel, quality control procedures, record keeping and reporting practices. NIST also sends recognized experts to observe testing at the laboratory. NVLAP accreditation is available to demonstrate competence to perform tests in accordance with the measurement procedure for digital devices used by the Commission, namely, American National Standards Institute (ANSI) C63.4-1992, entitled "Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz," published by the Institute of Electrical and Electronics Engineers, Inc. on July 17, 1992, as document number SH15180. See 47 CFR 15.31(a)(6). We understand that NVLAP accreditation typically costs $5000 to $7500 for the initial accreditation with an annual administrative fee of approximately $2500 thereafter.

National Voluntary Conformity Assessment System Evaluation (NVCASE) program be used to accredit a minimum of five competing Registrars for EMC test lab accreditation.[28] Intellistor also agrees that some method of laboratory accreditation is needed, but is concerned about the cost of NVLAP accreditation.

33. Apple, Certitech, Dell, Elite, HP, ITI, ITAC and Retlif, support mandatory accreditation for independent labs, but not for manufacturers' labs. Apple, Certitech, Dell, HP and ITI recommend that the current FCC site registration program be continued for manufacturers' labs. Apple states that we should permit manufacturers' test facilities to choose between NVLAP approval or FCC site listing. Apple also recommends that we model our site registration program on ISO 9000.[29] Certitech recommends that the FCC site registration program be improved to include periodic FCC inspections of labs and indicates that these inspections could be funded by a registration fee. On the other hand, CCITL, CES, EESI, PCTEST and Timco believe that accreditation should apply equally to all testing labs, including manufacturers' labs. For example, Timco states that accreditation can only be fairly implemented if it is applied to all test facilities.

34. Other parties, including AT&T, Burle, Certitech, Compaq, Dell, EIA/CEG, GMC, HP, IBM, ITI, Mark Lapachak, MicroENERGY, NEC, Michael Nicolay, SGI, Sony, Spirit, Sun, TI, Unisys and Xerox, oppose any requirement for mandatory accreditation of testing labs. These parties argue that the added cost and burden of accreditation are not warranted. For example, AT&T argues that currently approved personal computers are not causing harmful interference even though the testing is conducted by non-accredited labs. Certitech states that NVLAP accreditation does nothing to support the goal of streamlining the certification and marketing of computers. Compaq states that the current system works and that we should not adopt a lab accreditation program. ITI believes that mandatory accreditation would not promote international harmonization and would be viewed as a trade barrier by off-shore manufacturers. Unisys states that NVLAP accreditation does not appear to be justifiable in the context of deregulation. Xerox believes that accreditation should only be used as a means to achieve international reciprocity. It notes, however, that Japan

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[28] NVCASE is a voluntary program, offered by the U.S. Department of Commerce's National Institute for Standards Technology, that evaluates and recognizes organizations which support conformity assessment activities. This program could be used to recognize accrediting organizations.

[29] ISO 9000 is a family of standards for quality management and quality assurance that have been developed and published by the International Organization for Standardization (ISO). The ISO is a worldwide federation of national standards bodies. The United States is represented through the American National Standards Institute (ANSI). The mission of the ISO is to promote the development of standardization and related activities in the world with a view of facilitating the international exchange of goods and services, and of developing cooperation in the spheres of intellectual, scientific, technological and economic activity.

currently accepts FCC site registration without requiring further testing.

35. AT&T, CES, Hong Kong, Intel and Tokin submitted comments regarding the accreditation of foreign labs. AT&T and Intel state that mandatory accreditation could result in barriers for foreign manufacturers. CES states that foreign labs should only be permitted to participate in accreditation if laboratories in the United States are granted authority to participate in equipment authorization in the European Union countries and others. Hong Kong requests that we consider recognizing labs that have been accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) and adds that HOKLAS already has an agreement with A2LA. Tokin recommends that we accept laboratory accreditations from foreign countries based on agreements between NIST and other countries.

36. A2LA, Gateway, ICC and Motorola support the proposed two-year transition period, during which parties would have the option of obtaining certification or using the DoC process while labs are obtaining NVLAP accreditation. These parties state that a two-year period seems adequate. Other parties including Certitech, CCITL, EIA/CEG, and IBM recommend a four-year transition period, while Washington Laboratories recommends three years. These parties argue that a longer time period is needed because of the large number of labs that will need accreditation. CCITL recommends four years to allow accreditors other than NVLAP to form programs. It states that accreditation should not be a requirement for a lab to perform DoC testing until the transition period is over. Compaq argues that the requirement to use certification while waiting for NVLAP accreditation would provide an unfair advantage to laboratories that are already NVLAP accredited.

37. Decision. We continue to believe some form of laboratory accreditation is important and necessary for ensuring the proper testing of digital devices for compliance with our rules. Although our existing equipment certification procedure does not require that test laboratories be accredited, the procedure does give our staff the opportunity to review the report on compliance testing before a product can be marketed. Under the new self-authorization DoC procedure, we will be relying solely on the test labs to ensure that the testing is performed correctly. The requirement for accreditation of test laboratories will provide greater confidence that the testing laboratory has the capability to do proper testing and will provide a means for excluding laboratories that are not properly qualified. In addition, a requirement for accreditation will more closely align our computer authorization procedures with those of other countries. As indicated by Motorola and others, accreditation may not always be explicitly required by other countries, but their procedures often effectively impose an accreditation requirement. We therefore will require that laboratories testing personal computers and peripherals under our new DoC procedure be accredited by an appropriate recognized entity.

38. We continue to believe that accreditation under NIST's NVLAP program will ensure that personal computers are properly tested for compliance with our rules. At the same time, we note that a number of the commenting parties expressed concern regarding the use of NVLAP as the exclusive means for accreditation and that alternative means of

accreditation should also be permitted. We agree that allowing additional parties to accredit test laboratories will reduce the cost and time needed to obtain accreditation and intend to permit laboratory accreditations by other parties. For example, we are familiar with the A2LA's accreditation program and believe that it too would provide appropriate assurance of the competence of test laboratories that test personal computing equipment. Accordingly, we will accept laboratory accreditation by the NIST NVLAP program, the A2LA accreditation program, and by other organizations approved by the FCC for purposes of testing personal computer equipment under our DoC procedure. In order to ensure the integrity of the laboratory accreditation program, we are instructing our staff to periodically review the accreditation process and maintain close coordination with NIST, A2LA and any others that may be performing accreditations. We are also delegating to the Chief of the Office of Engineering and Technology the authority to recognize additional accrediting organizations and to make determinations regarding the continued acceptability of individual accrediting organizations and accredited laboratories.

39. We are not persuaded that laboratories affiliated with manufacturers should be excluded from accreditation. No persuasive evidence has been presented in the record of this proceeding to indicate that manufacturers' laboratories are more likely to perform compliance testing of personal computers in a manner that is more acceptable than independent laboratories. We also agree with those commenters who argue that excluding manufacturers' test labs from required accreditation would place them at an unfair advantage over parties, such as small businesses, that must employ independent test laboratories where accreditation would be required. Accordingly, we will require that any laboratory that tests digital devices for compliance under the DoC process must be accredited through an approved accreditation program.

40. We believe that our laboratory accreditation requirement will support efforts towards international harmonization. One of the barriers to foreign acceptance of United States product approvals has been the lack of a process for assuring the quality of laboratory testing in the U.S. We believe our laboratory accreditation requirement will provide the assurance of testing quality needed by foreign administrations to accept U.S. test results. This would benefit our manufacturing industry in international trade by eliminating the need for additional testing to market U.S. products in foreign countries. In the interests of promoting fair competitive trade, we intend to work closely with administrations of other countries to develop mutual recognition agreements regarding acceptance of the accreditations of both U.S. and foreign laboratories. At the same time, we agree with CES that it would be unfair to accept the accreditation of labs from foreign countries that either do not accept U.S. accreditations or that impose additional barriers upon U.S. companies. Accordingly, for purposes of our DoC procedure, we will accept accreditation of foreign laboratories from countries with whom the United States has a mutual recognition agreement to accept the accreditation of U.S. laboratories. Foreign manufacturers using non-accredited laboratories may continue to seek equipment approval for personal computing devices under our certification procedure.

41. We now believe that we should continue to allow certification of personal computing equipment on an indefinite basis. This will allow manufacturers and importers of personal computing equipment to use either the new DoC procedure or the certification procedure for authorization of personal computing equipment, whichever best meets their individual needs and circumstances. Consistent with this approach, we find that no special transition period is needed with regard to the implementation of the DoC procedure. While we recognize that currently accredited laboratories may have some initial advantage in that they will be able to perform testing under the DoC procedure sooner than others, this advantage should be mitigated by our decision to permit additional parties to accredit laboratories. Further, we find no compelling reason to penalize manufacturers and importers desiring to take advantage of our new self-authorization process by delaying the initiation of that procedure until all laboratories can obtain accreditation.

B. Authorization of Modular Personal Computers

42. In the Notice, we proposed to require that all CPU boards, power supplies, and enclosures designed for use in personal computers and marketed separately to the public be authorized to demonstrate compliance with the technical standards contained in Part 15 of our rules.[30] We also proposed to allow any party to assemble and self-approve a personal computer using authorized components or to interchange these components in an existing personal computer system without the need to retest the resulting system, provided the assembly instructions provided with the components are followed.[31] We indicated that the assembler would be required to issue a new DoC indicating the basis on which compliance was ensured, e.g., only authorized components were used in the assembly or authorized components were installed in an authorized system. We further proposed to require that the DoC identify each component used in the computer, include a statement that the computer complies with Part 15 of the FCC Rules, identify the compliance reports for each product used in the computer by date and number, and identify by name, address and telephone number the assembler responsible for ensuring that the resulting system complies with the standards.

43. In the Notice, we proposed to define a CPU board as a circuit board that contains a microprocessor, or frequency determining circuitry for the microprocessor, the primary function of which is to execute user-provided programming, but not including: 1) a circuit board that contains only a microprocessor intended to operate under the primary control or instruction of a microprocessor external to such a circuit board; or 2) a circuit

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[30] We proposed to apply the same authorization procedure to both personal computers and their components. Currently, individual components are treated as subassemblies and are not subject to testing or authorization requirements. See 47 CFR Section 15.101(c) and (e).

[31] We proposed to continue to permit personal computers to be authorized as a complete system, without having to obtain a separate authorization for each internal component.

board that is a dedicated controller for a storage or input/output device. We proposed to require that the CPU board be tested twice to help ensure it would be likely to comply with our emissions requirements in different modular computer configurations. In the first test, the CPU board would be tested without an enclosure and connected to a power supply with the oscillator circuit for the microprocessor operating with the output coupled to the microprocessor circuit, as would occur under normal operation.[32] No peripheral devices would be connected during this first test, and only radiated emissions would be measured. Further, under this first test, we proposed to permit the radiated emissions to exceed the limits specified in our rules by a specified amount, e.g., 6 dB. The second test of the CPU board would take place with the CPU board installed in a representative enclosure, with a representative power supply, and configured in the manner currently specified under our rules.[33] This second test would demonstrate compliance with the appropriate standards for both radiated and conducted emissions.[34] We requested alternative suggestions to this proposal along with comments as to how to deal with the fact that a CPU board may be capable of accepting microprocessors from multiple manufacturers.

44. We proposed to permit power supplies to be authorized based on a single test with the power supply installed in a typical configuration.[35] We proposed that enclosures for personal computers, be shown to provide 6 dB of shielding effectiveness across the spectrum from 30 MHz to 1000 MHz. We added that the DoC for the enclosure would be required to specify the particular types of CPU boards for which it is authorized (e.g., for use with "486DX2" CPU boards). We also proposed to require that any special steps necessary to ensure compliance be explained in the installation instructions. Finally, we proposed to prohibit authorization of CPU boards or internal power supplies that require complex electrical changes to the host system, such as soldering parts or altering circuitry.

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[32] If the oscillator and microprocessor boards are contained on separate circuit boards, both boards, typical of the combination that would normally be employed, would be used in the tests.

[33] See 47 CFR Section 15.31(a).

[34] The current rules require that personal computer equipment be tested to show compliance with technical standards that limit the level of RF energy that may be radiated from the device and conducted onto the AC power lines. The radiated limits are intended to protect communications above 30 MHz and the conducted limits protect communications below 30 MHz.

[35] We have found that the design of the computer power supply generally determines the ability of the computer to comply with our standards for limiting emissions conducted onto the AC power lines. In this case, interaction between the various components within the computer should have little impact on the ability of the power supply to demonstrate compliance with the standards.

45. The responses to the proposals for self-authorization of personal computers using modular components varied greatly. A number of commenting parties, including Apple, CompTIA, HP, ICC, ITAC, ITI, Intellistor, Mark Lapchak, Motorola, Bruce Reynolds, Spirit, Unisys, and Xerox support permitting the authorization of modular computers that are assembled from approved components. HP states that modular component authorization approach will increase the likelihood that computers built by system integrators will comply with the Commission's technical standards. ITAC states that permitting the self-authorization of modular computers will level the field between manufacturers who have been complying with current testing rules and system integrators who have not been performing compliance testing. ITI believes that imposing a DoC program for components will improve the likelihood of industry compliance, especially in cases where regulations have previously been ignored. CompTIA supports the proposal, but argues that the proposed requirement for the assembler to issue a new DoC would be burdensome. ICC recommends that the assembler not be held responsible for system compliance if all the components used are DoC approved. Intellistor believes that technical standards should be expanded to also include devices, such as hard drives, video boards and other components, to help ensure the assembly of a compliant system.[36] Unisys also recommends requiring testing of other components such as accelerator cards, microprocessor upgrades and interconnecting cables. Xerox recommends that the rules on modular assemblies should encompass all modular components and devices to avoid confusion over whether products such as printers or other peripherals are covered under the new procedures. It also recommends that manufacturers be required to provide specific instructions regarding the use of any special cabling or any restrictions on uses in the documentation included with the device.

46. Apple believes that computers assembled from modular devices should be subject to tighter emissions limits than the present FCC Class B limits and some form of special labelling. It suggests that we subject power supplies and CPU boards to emissions limits that are 6 dB below the current limits for personal computers and that we require that component devices be tested in a minimum configuration.

47. A number of other parties, including AFCCE, AST, AT&T, Capital Cities/ABC, Carl T. Jones, CCITL, Dell, Gateway, MicroENERGY, MSTV, Michael Nicolay, SGI, Sony and TI believe that the modular computer proposal presents a risk of increased interference, and are opposed to any changes that would eliminate testing of the final assembled system. AFCCE, for example, states that the proposal fails to recognize that the final configuration of a system is an important factor in determining compliance. AST states that there is no guarantee that a system assembled from approved subassemblies or components will comply with the rules. AST is further concerned that double testing of a single product may be required, i.e., both the component and the final assembled system, and that this would increase costs. AT&T believes that assembly of new computers from

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[36] We note that video boards already are defined as peripheral devices and are subject to the standards and equipment authorization requirements.

authorized components should not be allowed until further data is available. Capital Cities/ABC states that testing components is not an adequate substitute for testing finished products. Compaq believes that the modular approach will reduce rather than enhance compliance and make enforcement virtually impossible. Dell also argues that authorization of modular computers would provide system assemblers and unfair competitive advantage over manufacturers. SGI states that modular computer compliance by testing components is technically incorrect and unsound. SGI recommends, at a minimum that any emission limit for components be set at minus 6 dB below the present Class B limits.

48. Gateway, Intellistor and ITAC comment on our proposed two-step testing of CPU boards. Intellistor states that the proposed two-step testing plan for CPU boards has merit but recommends that the procedures for such testing be developed through a joint FCC and ANSI subcommittee. Gateway and ITAC oppose the two-step testing plan. Gateway states that it will be difficult to ensure that a board that is permitted to exceed the limit during the first test will later comply when installed in a system. ITAC believes assemblies should be tested in a representative configuration under the current procedures.

49. CCITL, Dell, Gateway, Intellistor, Motorola and Sony support some type of separate authorization plan for power supplies. Dell, while opposing authorization of other components, states that modular approval does seem justifiable for power supplies. Similarly, Gateway submits that the power supply primarily affects the ability of a computer to comply with the conducted limits and therefore can be authorized separately. CCITL states that power supplies should be subjected to full and half resistive loads on power supplies to demonstrate compliance with the conducted emissions limits. Intellistor suggests that power supplies be pre-scanned with a minimum and maximum load and then tested with a typical CPU to identify the broadband characteristics of the power supply. Motorola also agrees with the proposal for separately authorizing power supplies. Sony recommends permitting power supplies to be tested with a non-inductive dummy load at the maximum rated output power as an alternative to testing in a typical configuration. However, AT&T argues that a power supply that is compliant when tested in one typical configuration may not comply in other configurations.

50. Several parties, including Apple, AT&T, Gateway, Intellistor and MicroENERGY oppose the establishment of shielding standards for computer enclosures. Apple believes that enclosures should not be authorized as stand-alone devices. AT&T states that there is no practical way to determine the effectiveness of an enclosure in shielding emissions from within due to the existence of seams, slots and other factors. Gateway states that the proposal to specify the types of CPU boards for an enclosure may not be a proper solution because certain boards can use different CPUs. Gateway is concerned that a shielding requirement would necessitate that manufactures to carry inventories of different enclosures to match different combinations of motherboards and CPUs. Intellistor recommends that testing enclosures be further studied. MicroENERGY believes that it is risky to expect that a cabinet will provide the same amount of shielding for different motherboards. On the other hand, CCITL recommends that computer chassis should be

subject to shielding effectiveness. Unisys expresses concern that demonstrating shielding effectiveness is very difficult.

51. Decision. As observed in the Notice, an increasing number of personal computers are now being custom assembled from modular components, including CPU boards, power supplies and enclosures. This modular component approach provides manufacturers and system integrators flexibility to produce a wide variety of equipment models to meet consumer needs. Under our current rules, each combination of CPU, power supply and enclosure must be separately tested for compliance. We continue to believe that there is need for a simpler means of authorizing computers assembled from modular components. At the same time, we also need to ensure that such a simpler approach does not permit such modular computers to pose a greater risk of interference. We find that a self-authorization DoC approach that permits the assembly of computers from authorized modular components with a requirement for some additional testing would provide both flexibility for manufacturers and system integrators and adequate assurance that such modular computers will comply with our technical standards. Based on the record in this proceeding, however, we are modifying our original proposal to tighten the emission limits for CPU boards tested without an enclosure to provide added assurance that modular computers will comply with our technical standards. Due to the difficulties associated with determining the shielding effectiveness of enclosures, we are not adopting our proposal to separately authorize enclosures. Accordingly, we are adopting the approach described below for authorizing modular computers. This approach, which is similar to that proposed in the Notice, will allow any party to integrate personal computer systems using authorized components without the need to retest the resulting system. Manufacturers will also continue to have the options of using the certification procedure or the new DoC procedure for personal computer equipment.[37] As part of this plan, we are requiring that any special steps needed to ensure compliance of a component must be explained in the installation instructions.[38]

52. Since the design of the CPU board is a critical factor in determining whether the completed computer system will comply with the standards, we believe it is essential that computers constructed from modular components employ CPU boards that are, themselves, designed to ensure compliance with our technical standards. To ensure that such CPU

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[37] We will continue to permit the authorization of complete computer systems. In such cases the individual components such as the CPU board and power supply will not have to be separately authorized.

[38] For example, the installation instructions shall address, where needed, the use of shielded connecting cables, the number and location of ground connections, the type of enclosure to be employed, and the addition of any needed components. Other statements may also be needed in the instruction manual. See, for example, 47 CFR Sections 15.21, 15.27, and 15.105.

boards will comply with these standards, we are requiring that CPU boards be authorized under either the DoC or certification procedures and be tested for compliance in the following manner. Testing for radiated emissions shall be performed with the CPU board installed in a typical enclosure but with the enclosure's cover removed so that the internal circuitry is exposed at the top and on at least two sides.[39] Additional components, including a power supply, peripheral devices, and subassemblies, shall be added, as needed, to result in a complete personal computer system. If the oscillator and the microprocessor circuits are contained on separate circuit boards, both boards, typical of the combination that would normally be employed, must be used in the test. Testing shall be in accordance with the procedures specified in Section 15.31 of our rules. Under these test conditions, the system under test shall not exceed the radiated emission limits specified in Section 15.109 by more than 3 dB. If the initial test demonstrates that the system is within 3 dB of the limits, a second test shall be performed using the same configuration described above but with the cover installed on the enclosure. Testing shall be in accordance with the procedures specified in Section 15.31 of our rules. Under these test conditions, the system under test shall not exceed the radiated emission limits specified in Section 15.109 of our rules. If, however, the initial test performed with the internal circuitry exposed demonstrates compliance with the radiated emission standards in Section 15.109, the second test is not required to be performed. The test demonstrating compliance with the AC power line conducted limits specified in Section 15.107 of our rules shall be performed in accordance with the procedures specified in Section 15.31 using an enclosure, peripherals, power supply and subassemblies that are typical of the type with which the CPU board under test would normally be employed.

53. The design of the power supply used in a personal computer is critical for ensuring compliance with the AC line conducted emissions limits. The amount of load placed on the power supply can significantly alter its emission characteristics. We therefore do not agree that power supplies should be tested as stand-alone products or with only resistive loads that may not be representative of normal loading. Accordingly, we are adopting our original proposal to require that power supplies be tested in a representative personal computer system. We believe that testing power supplies in a representative system will provide a more accurate depiction of emission levels, both conducted and radiated. A power supply that has been tested in this manner and found to comply with the emissions limits may be authorized under either the DoC or certification procedures for use in modular computers.

54. We concur with the commenting parties regarding the difficulties associated with testing enclosures for shielding effectiveness. In particular, we recognize that enclosures for personal computers can affect the emission characteristics of the components contained within the enclosure and that these effects may vary with different components and their placement

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[39] This is representative of what would occur with the cover removed from a typical enclosure.

within the enclosure. We believe, however, that the standards and test procedures we are establishing for CPU boards and power supplies should be sufficient to eliminate the need to specify standards for enclosures. Should we find compliance problems due to ineffective shielding, we may revisit standards for enclosures in a future proceeding.

55. In summary, as proposed in the Notice, we are permitting the assembly, without additional testing, of personal computer systems from separate authorized components. The assembler must follow all of the installation instructions for the separate components in assembling the system. The assembler of the system also must label the system as indicated above and include a separate DoC for the completed system. The DoC must provide a list of all individual components used in assembling the system along with the name, address and telephone number of the company performing the assembly. The assembler of the system will be the party responsible for ensuring that the system complies with the standards. The assembler, upon notification that a specific system combination does not comply with the limits or is causing harmful interference problems, must immediately cease using that combination of components until the problem is corrected and take any additional remedial actions the Commission may deem necessary. Finally, we will not permit the separate authorization of CPU boards or internal power supplies that require complex electrical changes to the host system, such as by soldering parts or altering circuitry. Such equipment may not be used in personal computers assembled from authorized modular component unless the resulting system is tested for compliance with the technical standards.